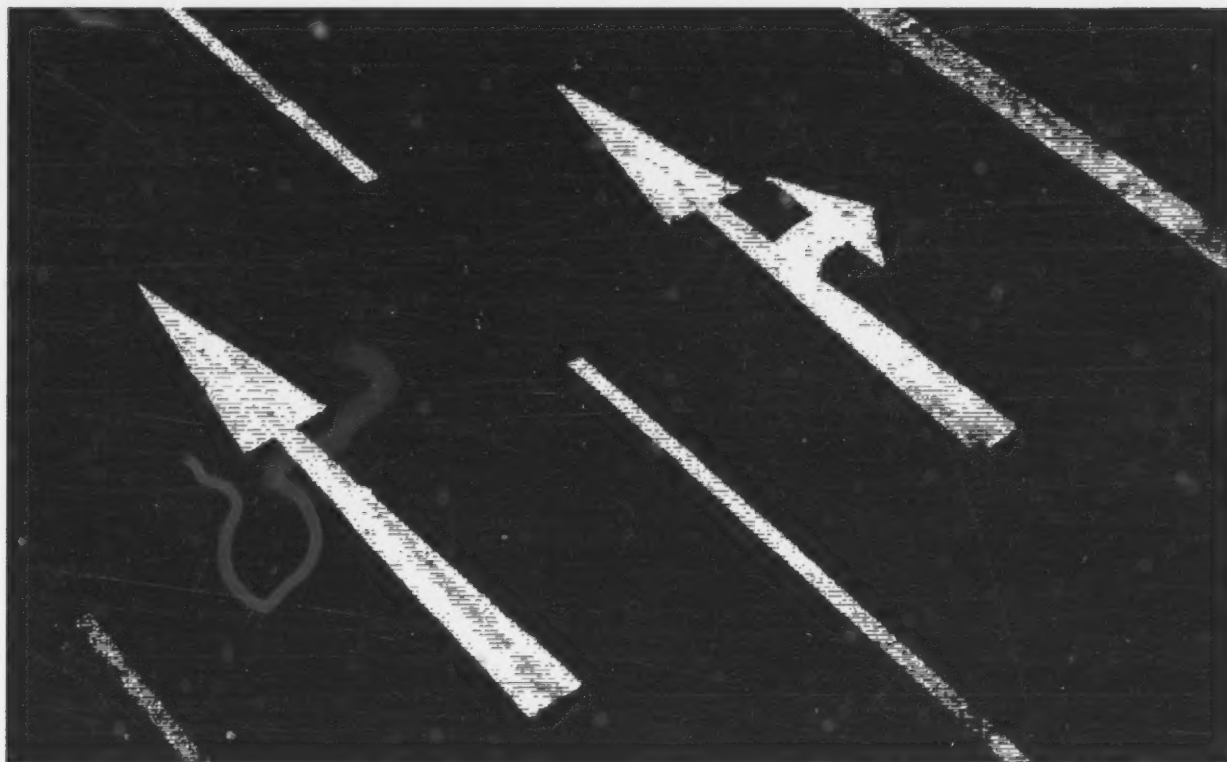


Alberta Finance and Enterprise

# Alberta's Competitiveness – A Primer for Discussion

June, 2010



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# Executive Summary

***Alberta is a highly prosperous jurisdiction; but continued prosperity is not guaranteed.***

Fuelled by strong energy prices and investment in the oil sands, Alberta's economy has expanded at an extraordinary pace in recent years. This exceptional growth has driven Alberta's living standards (as measured by GDP per capita) to a level that far exceeds any other province and nearly all international jurisdictions.

However, further analysis reveals that this prosperity is by no means secured. Alberta's standard of living has in large part been driven by income earned through the development of non-renewable resources. When the price of key commodities falls so does Alberta's prosperity. Alberta's future economic prosperity will rest on its ability to be competitive and resilient in an ever-changing global marketplace.

***Competitiveness is the key to securing Alberta's future prosperity.***

*"The fundamental source of long-term prosperity is the productivity with which a nation (or province) can utilize its human, capital and natural resources to produce goods and services... Competitiveness ... is about creating the conditions under which companies and citizens can be the most productive"<sup>1</sup>*

Securing Alberta's future prosperity will require continuous improvements in productivity. Productivity is about working smarter, not harder. It's about strategic investments to make existing staff more efficient and effective, not simply about adding more staff. It's about developing higher valued goods and services, not about producing the same goods or commodities made in lower cost jurisdictions.

Innovation drives productivity improvements. It can involve the introduction of new processes, new technology, new machinery or new equipment. Organizations themselves may undertake research to develop better products and processes, or instead capitalize on the innovations developed by others. For organizations to improve productivity they must do something better, or more innovative, than before.

Alberta's competitiveness, then, is not about becoming the lowest cost jurisdiction – indeed, globalization and the emergence of low cost producers such as India or China makes this a near impossible task. It is also not about "picking" the right sectors to achieve overall prosperity. It is about creating the conditions to sustain increases in economic prosperity through overall improvements in innovation and productivity.

***Government and industry must work together to make Alberta more competitive.***

Government and industry both have a role to play in achieving sustainable prosperity. However, incremental changes, be it in government regulations or business R&D expenditures, will not be enough to achieve this desired outcome. A fundamentally different, more synergistic approach is required – one that drives towards a common set of desired outcomes.

Government, in partnership with industry, has the responsibility to create an environment within which industry can and will be innovative. Industry, in partnership with government, has the responsibility to be innovative – to utilize its human, capital and natural resources in more productive ways. Together, results can be achieved that are otherwise unattainable.

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<sup>1</sup> Michael Porter in *Competitiveness Index: Where America Stands*, Council on Competitiveness, 2007

***Alberta is competitive in some areas, but opportunities for improvement exist.***

Alberta's ability to compete in a global market is dependent on how well it is doing in a number of key areas relative to other comparable jurisdictions. Compared to other jurisdictions (both within and outside of Canada) Alberta is well positioned in a number of areas.

- Debt (as a share of GDP);
- Marginal Effective Tax Rates;
- Labour productivity levels;
- Investment in Machinery and Equipment (M&E);
- Student educational achievement;
- Apprenticeship completions.

However, based on what can be commonly measured and compared to other jurisdictions, Alberta has room for improvement in the following areas:

- On *Productivity*, Alberta has achieved a very high level of labour productivity, but *growth* in productivity has been lacklustre in recent years. This is noteworthy because, over time, productivity gains are the only way to sustain a higher standard of living for Albertans.
- On *Innovation*, Alberta lags most jurisdictions on measurable indicators of innovation. Investments in Research and Development (R&D) are extremely low, particularly at the business level. Spending on business R&D can lead to the creation of new products and services. Alberta is unique in many respects, and needs to be more proactive in creating new products to improve productivity within Alberta based companies.
- On *Human Capital*, Alberta is in line with the national average in terms of the share of adults with a post-secondary education and outperforms its Canadian peers on apprenticeship completion rates. However, the province ranks well below the jurisdictional average on the number of adults with a Bachelor Degree or higher. An educated and skilled workforce is critical to improving innovation and productivity as well as producing value-added products or services.
- On *Access to Capital Markets*, Alberta like other Canadian provinces has a well developed financial system, particularly for conventional sources of financing. However, venture capital, an important source of funds for young, higher-risk and innovative ventures, is much less plentiful in Alberta relative to almost all other jurisdictions.

Sustained economic prosperity will not happen on its own. Past decisions have contributed to today's high living standards. New decisions are needed to sustain economic growth and prosperity. Government and industry must work together if the living standards Albertans have come to expect will continue to improve for their children or grandchildren. One thing is certain: the status quo is not an option.

# Introduction

***"Competitive economies are those that have in place factors driving the productivity enhancements on which their present and future prosperity is built"***

(World Economic Forum, The Global Competitiveness Report, 2009-2010.)

***"Competitiveness is not about a low-cost labour force, the largest share of exports or even the fastest economic growth. It is about creating the conditions under which companies and citizens can be the most productive so that wages and return on investment can support an attractive standard of living"***

(U.S. Council of Competitiveness)

## Background

***The Competitiveness Act will strengthen linkages between government and industry towards a shared goal of competitiveness.***

Albertans continue to be profoundly impacted by developments in the global economy. On the heels of the most severe global economic recession in decades, Albertans face a difficult and uncertain economic climate. At the same time, the forces of globalization remain intact — competition for new markets, capital, and skilled labour continue to intensify. Against this backdrop, Alberta's future economic prosperity will be tested by its ability to be competitive in a global marketplace.

The Alberta Competitiveness Act signals government's resolve to strengthen its linkages with industry and make Alberta one of the most competitive jurisdictions in the world. The Act is intended to foster collaboration between government, industry and Albertans towards a shared strategy to improve and sustain the province's competitiveness in the global economy.

This report provides a snapshot, based on existing information sources, of Alberta's overall competitiveness relative to a number of comparative jurisdictions. It identifies areas of strength and opportunities where improvements can be made. But it is only a starting point. Moving forward, the government is committed to clarifying Alberta's competitive position, both at an economy-wide and sector level.

## What is Competitiveness?

***Competitiveness means creating the conditions for sustained economic prosperity.***

Competitiveness conveys a different meaning when applied to an individual firm, sector, or economy in general. To a business, competitiveness may mean increasing sales, lowering costs and gaining market share. To an economy, competitiveness has a much broader interpretation — creating the conditions so that companies and people can thrive.

Competitiveness is not an end in itself. For this report, Alberta's competitiveness is defined as *the conditions created when government, industry and Albertans work together to pursue sustained economic prosperity.*

The goal of sustained economic prosperity would be a hollow outcome if it comes at the expense of the environment, living conditions, safety or other core societal values. Competitiveness works in conjunction with Alberta's core values, not at their expense. While non-economic outcomes are not explicitly stated, woven within the fabric of sustained economic prosperity is the expectation that Albertans' core values are not degradable in the pursuit of competitiveness.



## A Competitiveness Framework for Alberta

In any given year, Alberta's economic situation is impacted by a variety of market conditions. These include oil and gas prices, global demand for Alberta's products, the labour market, etc. But ultimately Alberta's prosperity is determined by the ability to remain resilient and productive in the winds of constant change. This is the nature of competitiveness.

Alberta's economic prosperity is best described in terms of standard of living, or the total income generated in the economy per person. This income is available for:

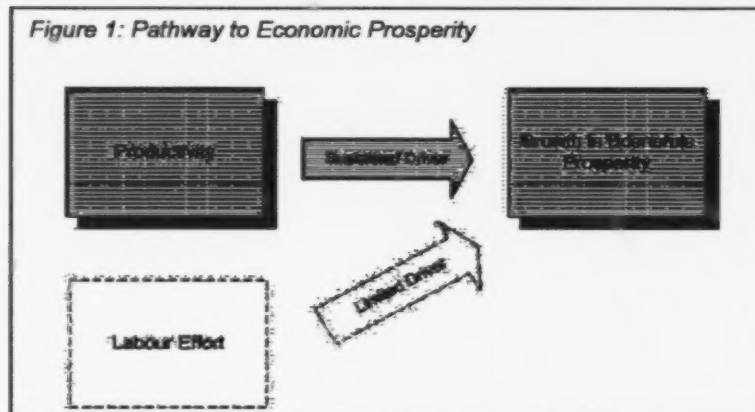
*The result of competitiveness is economic prosperity for Albertans.*

- Individual consumption and saving;
- Company re-investment; or
- Government spending on health care, infrastructure, social services, education, etc.

Competitiveness, then, is a focus on generating more income for Alberta on a sustainable basis. In general, there are two channels for pursuing higher living standards:

- *Labour Effort.* Albertans can boost total economic output by increasing total labour effort – that is, increasing participation of Albertans in the workforce or increasing hours worked.
- *Productivity.* In its simplest form, improving productivity means extracting more value from limited resources. Labour productivity, or value created<sup>2</sup> per hour worked, can be pursued through more efficient use of labour resources (e.g., improved processes, new equipment, automation, etc) or through higher value added production (i.e., new and innovative products and services).

Figure 1: Pathway to Economic Prosperity



<sup>2</sup> Represents the total value of output produced less the resources (excluding labour) used.

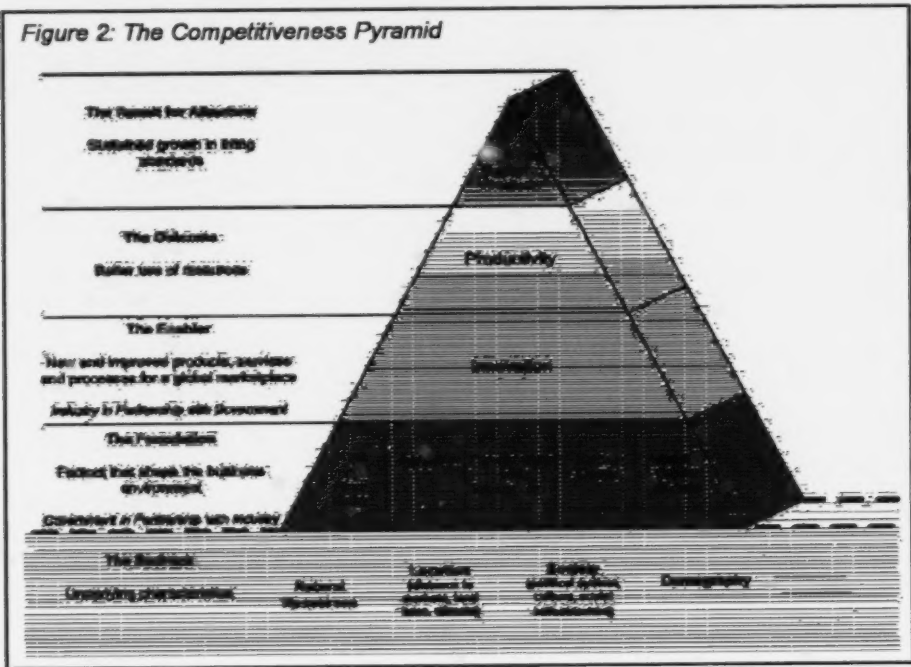
Only productivity can yield sustained increases in Alberta's living standards.

However, *sustained* increases in Alberta's living standards can only be achieved through productivity gains. Certainly, there are ways to improve workforce participation (e.g., delay retirement age), but eventually Alberta's economy will bump into labour supply constraints. Albertans can only exert a finite amount of work effort and demographic forces (e.g., an aging population) will limit labour availability.

Productivity, on the other hand, has no limit. It can continue to rise so long as the drivers of competitiveness remain responsive to the forces of change. Indeed, productivity can overcome constraints on growth caused by a scarcity of resources. As leading competitiveness expert Michael Porter describes:

*"True competitiveness....is measured by productivity. Productivity allows a nation to support high wages, a strong currency, and attractive returns to capital—and with them a high standard of living. Productivity is the goal."*<sup>3</sup>

Figure 2: The Competitiveness Pyramid



Innovation is the enabler of productivity.

To improve productivity, Albertans need to be doing something better, or more *innovative*, than they were before. Innovation is the enabler of productivity and, in this report, broadly captures any new way of doing something better — investing in new machinery and equipment, adopting more effective processes, training up or hiring highly skilled labour, undertaking research and development, etc.

<sup>3</sup> Porter, Michael: "Building the Microeconomic Foundations of Prosperity: Findings from the Business Competitiveness Index," *The Global Competitiveness Report 2003-2004*, World Economic Forum, p. 31.



While key to future economic prosperity, there is no "magic formula" for improving Alberta's innovation performance and productivity. Rather, it is a mix of underlying factors (institutions, policies, programs) that paves the way for Albertans to be productive. These factors, known as the *Foundation*, are explained in more detail later in the report and include:

- Taxes and fiscal policy;
- Regulations;
- Transportation and infrastructure;
- Human capital; and
- Access to Capital.

*The Foundation paves the way for Albertans to be productive.*

It is through these factors that government can offer a more attractive business environment. But once the Foundation is laid, it is *industry* that plays the lead role in generating wealth, jobs and tax revenue. A strong connection between industry and government helps create the right mix of policies for Albertans to flourish.

Underneath the competitiveness pyramid lies the *Bedrock*, or the characteristics that are inherently Alberta. These characteristics are largely assumed as given by industry and government policy makers, and influence the shape and strength Alberta's foundation. Such characteristics include natural resource endowment, location (distance to markets, land base, climate), societal factors (political system, culture and social infrastructure) and demographic characteristics. Moving Alberta along the path to prosperity requires that government, with the support of industry, lay a foundation that is based upon and responsive to the Bedrock characteristics.

#### **Box 1: Environmental and Social Sustainability**

Achieving sustained economic prosperity requires carefully balancing the environment and social objectives with economic activity. Economic growth must occur within the capacity of the environment. Similarly, economic activity requires that social needs expectations are met.

This report recognizes the importance of the environmental and social factors to economic well being. The focus is on examining the factors that drive economic prosperity, assuming that the appropriate environmental and social policies are in place and in the main are integrated into the foundation.

## **Competitiveness at the Sector Level**

The focus of this report is on developing an understanding of a competitive economy, one that leads to sustained increases in economic prosperity. The competitiveness framework is broadly applicable to all sectors in the economy.

However, when looking at the competitiveness of certain sectors, there are some additional and more specific "micro-drivers" of productivity that are commonly considered, including:

- **Demand conditions.** Sophisticated and informed customers, supported by consumer protection laws and strict quality, safety and environmental standards.
- **Stage of Cluster Development.** Concentrations of industrial activity along the supply chain, with strong linkages between government, industry and academia.

- **Degree of Competition.** The degree of competition has an impact on the degree of innovation and productivity in an industry.
- **Factor Inputs.** Access to high quality business inputs (e.g., human resources) and infrastructure. This also includes business costs, or the cost of factor inputs, which vary significantly across different industries. High business costs force industries to achieve stronger productivity gains to remain competitive.

These and other micro drivers of competitiveness provide more detail than the "big picture" focus of this report and will be examined in subsequent sector-specific reports.




## Benchmarking Alberta to its Peers

More than ever, Alberta must be able to compete in an increasingly global economy where capital and labour move freely. Alberta needs to create an environment that will attract and retain the world's finest technology and workers.

Measuring Alberta's competitiveness in today's global economy requires that international comparisons be made. Alberta can no longer strive to be the most competitive jurisdiction in Canada. The province must rank among the most competitive in the world.

This study employs international benchmarks, chosen on the basis of their strong relative economic performance and/or their size and structural similarities with Alberta. The following Canadian, American and Overseas jurisdictions were selected:

Figure 3: Comparator Jurisdictions

Canada	United States	Overseas
		
<ul style="list-style-type: none"> <li>British Columbia (BC)</li> <li>Saskatchewan (SK)</li> <li>Manitoba (MB)</li> <li>Ontario (ON)</li> <li>Quebec (QC)</li> </ul>	<ul style="list-style-type: none"> <li>Washington (WA)</li> <li>Colorado (CO)</li> <li>Idaho (ID)</li> <li>Texas (TX)</li> <li>Minnesota (MN)</li> <li>Oregon (OR)</li> </ul>	<ul style="list-style-type: none"> <li>Norway (NOR)</li> <li>Finland (FIN)</li> <li>Australia (AUS) (Queensland)</li> </ul>

## Alberta's Performance

A summary of Alberta's performance under each indicator is provided in Table 1, organized by the level of the competitiveness pyramid. The indicators were selected based on three criteria: meaningfulness, measurability and comparability to other jurisdictions. More information on the indicators selected is provided in the remaining sections of the report.

Table 1 reveals areas of particular strength for Alberta including living standards, economic well-being, labour productivity, M&E investment, and taxes and fiscal policy. Indicators where Alberta lags behind other jurisdictions include growth in real GDP per capita, productivity growth, R&D investment, and venture capital investment.

**Table 1: Benchmarking Scorecard**

Indicators	Alberta's Rank	Index Score <sup>3</sup>	Jurisdiction Leader
<b>Economic Prosperity</b>			
Living Standards (GDP per capita) 2008	1	100	Alberta
Growth in real GDP per capita 2003-08	13	50	Oregon
Economic Well-being 2008	1 (of 10)	100	Alberta
<b>Productivity</b>			
Labour Productivity Level (GDP per hour worked) 2008	2	100	Texas
Growth in Labour Productivity 2003-08	11	50	Oregon
<b>Innovation Performance</b>			
Total R&D* 2007 or LYA**	14	50	Washington
Business R&D* 2007 or LYA**	13	50	Washington
M&E investment* 2008	2 (of 10)	100	Australia
ICT investment* 2008 or LYA**	9 (of 9)	100	US Average
<b>The Foundation</b>			
<b>Taxes and Fiscal Policy</b>			
Marginal Effective Tax Rates - METRs 2009	2 (of 10)	100	Finland
Top Marginal Personal Income Tax Rate 2010	3	100	Washington
Net Government Debt* 2009	1 (of 12)	100	Alberta
<b>Regulatory Environment</b>			
Business Costs 2010	5 (of 13)	100	Manitoba
<b>Access to Capital Markets</b>			
Outstanding Business Loans* 2008	4 (of 8)	100	Ontario
Venture Capital Deals (per 100,000 people) 2007	11 (of 12)	50	Washington
Venture Capital Fund Investment* 2007	14 (of 14)	50	Washington
<b>Transportation and Infrastructure</b>			
Average age of Total Public Infrastructure 2007	2 (of 6)	100	Ontario
Value of Stock of Public Infrastructure per capita 2007	1 (of 8)	100	Alberta
<b>Human Capital</b>			
Scholastic Achievement (PISA results) 2006	2 (of 10)	100	Finland
High School Completion (% of Pop 25 - 64 years) 2007	7	100	Minnesota
Apprenticeship completion (% of labour force) 2007	1 (of 6)	100	Alberta
Bachelor Degree Completion (% of Pop 25 - 64 years) 2007	12	100	Colorado
Unemployment Rate 2005-09	2	100	Norway

<sup>1</sup>Unless otherwise stated, ranking based on 15 jurisdictions (including Alberta). At a minimum, each indicator includes data for the six benchmarked Canadian provinces. Where state level data are not available the U.S. average is used.

<sup>2</sup>The index score represents the percentage deviation from the jurisdictional average. For indicators where a small value is favourable – unemployment rate, business cost index, debt to GDP ratio, and the METR – the inverse of the measure is taken. For example, the jurisdiction with the lowest unemployment rate would have the highest index score.

<sup>3</sup>Jurisdictional average = 100

\*As percent of GDP

\*\*LYA - latest year available

Indicators capture all sectors of the economy

# Economic Prosperity

## What it Means

Economic prosperity reflects the standard of living of a jurisdiction. It represents the total income generated each year that is available to all citizens.

This income can flow to individuals for personal consumption and saving; to companies to re-invest, or to government for public services including health care, infrastructure, social services and education.

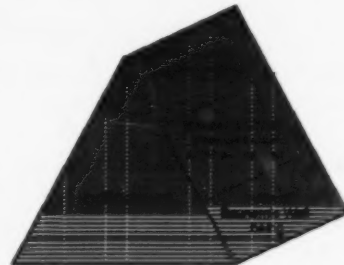
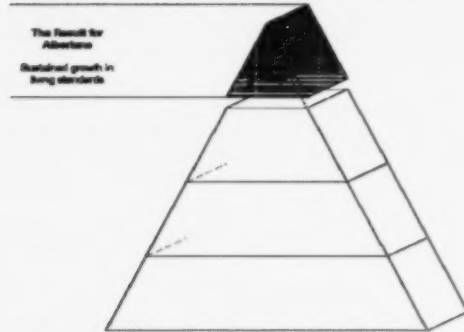
A related and complementary measure to standard of living is economic well-being, whereby explicit weighting is given to non-consumptive components of economic welfare, including wealth, security, and equality.

## How it is Measured

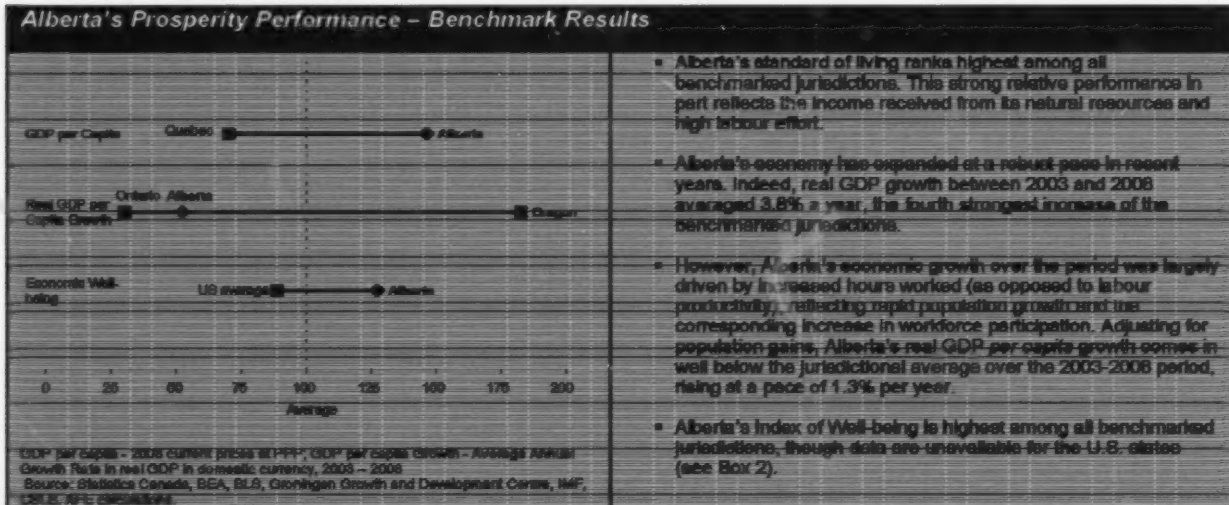
The most common and widely accepted measure of a jurisdiction's standard of living is Gross Domestic Product (GDP) per capita. This is simply the total economic output generated by a jurisdiction divided by the population. In some jurisdictions a dollar of output can buy more goods or services – or has more purchasing power – than in others. Therefore, to facilitate comparisons, all GDP estimates are converted to a common measure of purchasing power known as purchasing power parity (PPP).

Improvements in living standards are supported by underlying growth in the economy in per capita terms. As such, growth in real GDP per capita is examined over the 5-year period of 2003 to 2008. This indicator removes the impact of prices (including highly volatile oil and gas prices), measuring growth in the volume of economic activity.

The Index of Economic Well-being is a complimentary measure of living standards, focusing on consumption, wealth, equality and security (see Box 2). The measure incorporates economic, social and environmental dimensions. It is important to track Alberta's performance in this area to highlight if high living standards are also translating into improvements in economic wellbeing.



## How Alberta Performs

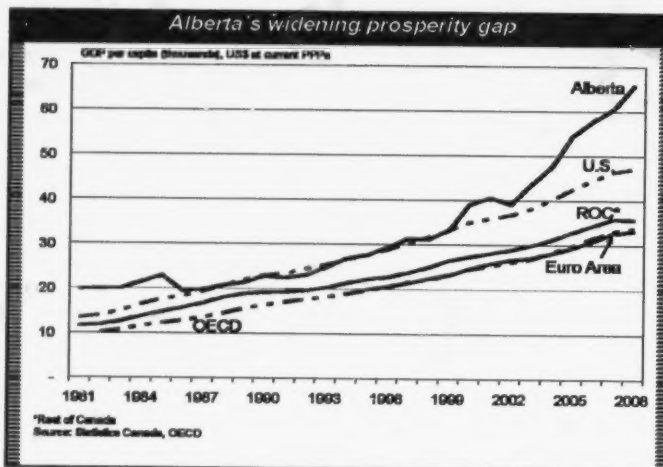


## Box 2: Index of Economic Well-being

The Index of Economic Well-being was developed in 1997 by economist Lars Osberg to account for non-consumptive aspects of well-being. The Index gives equal weighting to four components of economic well-being: consumption, wealth, equality and security:

- **Consumption:** government and personal spending per person, adjusted by family size and life expectancy.
- **Wealth:** fixed capital stock, research and development (R&D) stock, human capital stock, net international position, and the social cost of greenhouse gas emissions.
- **Equality:** the Gini coefficient of income inequality and poverty intensity (poverty rate multiplied by poverty gap).
- **Security:** unemployment, medical expenses due to illness, single-parent poverty, and elderly poverty.

Alberta has long been considered a prosperous jurisdiction. But not until recently has Alberta's prosperity been dramatically set apart. The percentage gap between Alberta's prosperity and that of the Rest of Canada has widened from 36% differential in 2002 to a staggering 85% in 2008. On an international scale, Alberta's standard of living now far passes that of the U.S., Euro Area and average of OECD countries. When Alberta is stacked up against industrialized countries, only Luxembourg comes in with a higher standard of living than Alberta as of 2008.<sup>4</sup> In terms of economic well-being, a complimentary measure that factors in consumption, wealth, equality and security, Alberta also ranks high, exceeding that of any other benchmarked jurisdiction.<sup>5</sup>



The widening of Alberta's prosperity gap vis-à-vis its international counterparts has its origins in the recent energy boom beginning in 2002. Soaring energy prices drove up corporate profits and government revenues. It also ushered in a surge of investment into Alberta's energy sector, leading to a range of high income job opportunities.

Nowhere was Alberta's growth more evident than in Alberta's oil sands – home to the world's second largest reserve of proven oil – where capital investment tripled between 2003 and 2007. The energy boom spilled over to other sectors, creating opportunities for other industries, including construction, industrial manufacturing, transportation and financial services. But it also led to higher business and construction costs in Alberta, crowding out investment and business opportunities in non-energy sectors of the economy.

Alberta's prosperity has been built upon high labour effort and productivity. Compared to other jurisdictions, a high percentage of working age Albertans are participating in the labour force and nearly all these people have a job (see Foundation – Human Capital). Albertans are also relatively productive – that is, they produce a large amount of value-added output per hour worked (see Productivity).

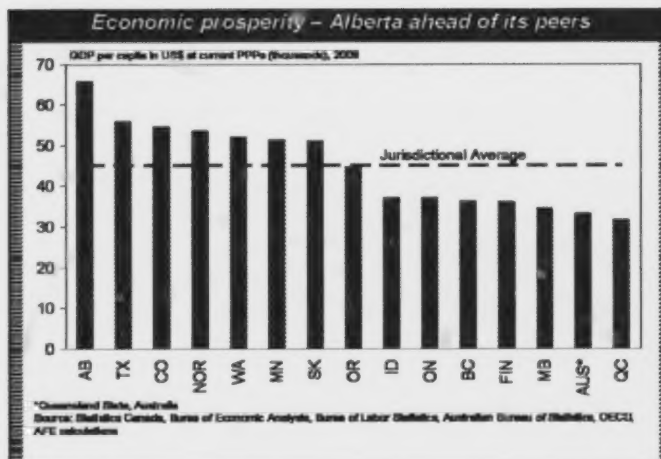
<sup>4</sup> Comparable data for 2009, the year of the global recession, are not yet available. Due to the profound impact of plummeting energy prices on Alberta's economy, it is expected that Alberta's prosperity gap narrowed in 2009. Preliminary nominal GDP estimates from the Alberta Budget (February 2010) suggests that nominal GDP per capita in PPP dropped approximately 17 percent in Alberta.

<sup>5</sup> Since the Index of Well-being is not available at the state level, Alberta is benchmarked against the U.S. average.



Neither of these factors is assured to drive improvements in Alberta's prosperity going forward. Albertans are already heavily engaged in the workforce and an aging population will continue to reduce the availability of labour. The province's labour productivity, meanwhile, is in large part derived from the incomes received from natural resources – these resources are subject to significant and unpredictable price instability.

The remaining sections of the report are focused on the long-term drivers of economic prosperity highlighted in the competitiveness pyramid. These sections compare Alberta's performance in productivity, innovation and foundational factors to other jurisdictions.





# Productivity

## What it Means

Productivity refers to how much value that is created from land, capital, renewable, non-renewable and labour resources. In other words, for each unit of a resource (hour of labour, unit of capital, barrel of oil, etc.), what is the value of output generated over and above the cost of resources used? Productivity gains can be pursued through:

- Increasing value added. Developing new and improved products and services, allowing companies to receive a higher price on their products and services relative to cost of resources used.
- Increasing efficiency. Finding more efficient ways of producing a given amount of output through process improvement, automation, new technology, strengthening human capital, etc.

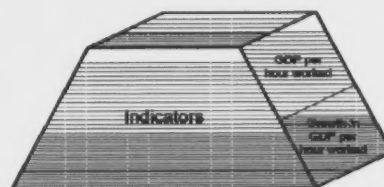
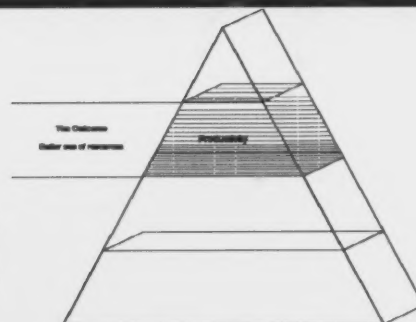
To sustain increases in living standards, the key is to improve labour productivity – that is, the value created per hour worked. There are limits to how much Albertans can work, but labour productivity has no limit. It can rise indefinitely so long as Albertans continue to find innovative ways to increase efficiency and value added.

## How it is Measured

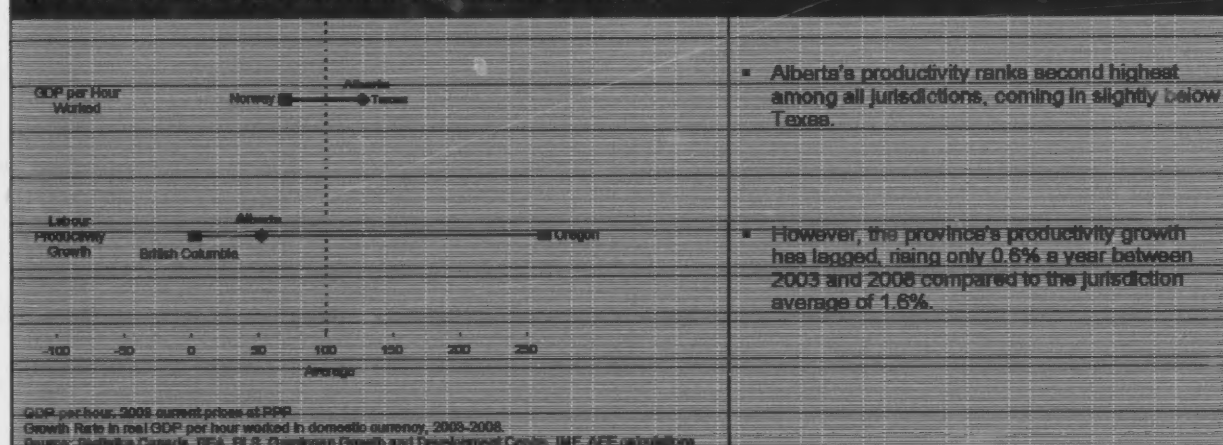
Labour productivity is measured as the total value of a jurisdiction's value-added output, or GDP, divided by the number of hours worked. As with the measure of economic prosperity, comparisons are facilitated by converting all GDP estimates into purchasing power parity (PPP).

To evaluate how much progress Alberta has made in improving productivity, we also measure growth in labour productivity over the five year period 2003 to 2008. To remove the impact of volatile commodity prices, growth in productivity is measured in real terms (i.e., holding prices constant).

## How Alberta Performs



### Alberta's Productivity Performance – Benchmark Results



▪ Alberta's productivity ranks second highest among all jurisdictions, coming in slightly below Texas.

▪ However, the province's productivity growth has lagged, rising only 0.6% a year between 2003 and 2008 compared to the jurisdiction average of 1.6%.

When it comes to the level of labour productivity, Alberta is a step ahead of its peers. The province boasts the highest labour productivity level of the major Canadian provinces and the second highest among all benchmarked jurisdictions.

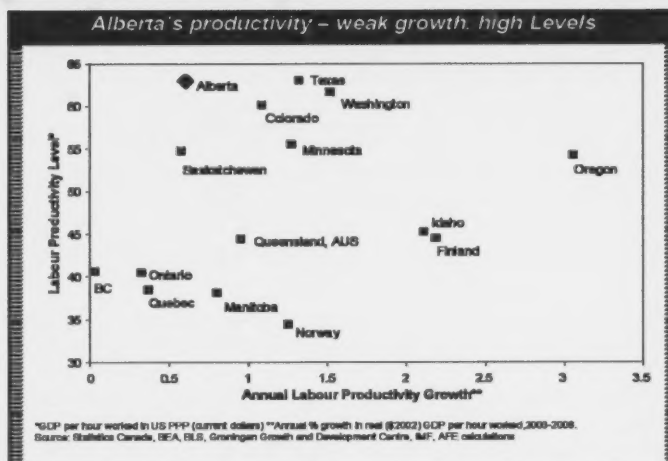
Alberta's strong productivity level is partly related to the role of the energy sector. With its high capital intensity, the oil and gas industry has a labour productivity level more than five times the provincial average.

But this is only part of the story. When the oil and gas industry is excluded from the data, Alberta's labour productivity remains ahead of the national average. In fact, a study by the Center for the Study of Living Standards showed that Alberta's labour productivity in 2007 ranked first or second in Canada in 8 of 15 market sectors.<sup>6</sup>

Still, the province's high productivity levels cannot be taken for granted. Indeed, Alberta's advantage relative to other jurisdictions has been slipping, with Alberta posting the fifth weakest productivity gains (0.6% per year) between 2003 and 2008 of all jurisdictions.

The oil and gas sector helps explain Alberta's overall productivity growth performance. Productivity in the sector has been falling due to the natural characteristics of the declining conventional oil and gas sector and the ramp up of the oil sands. Typically, productivity is low during the exploration and development stages, since labour and capital are being expended with production yet to come. Therefore, the sector's productivity performance reflects the economic life-cycle of oil sands and conventional oil and gas projects, and is not indicative of inefficient investments.

It is illustrative to compare Alberta's labour productivity growth without the oil and gas sector to other jurisdictions. In this comparison, Alberta's 2.0% annual productivity growth rate between 2003 and 2008 fairs well compared to both the overall jurisdictional (1.2%) and Canadian jurisdictional (0.5%) productivity growth rate.



<sup>6</sup> These sectors include construction, manufacturing, retail trade, finance and insurance, professional and scientific services, administration and support, and accommodation and food services. Source: Centre for the Study of Living Standards (CSLS), "New Estimates of Labour, Capital and Multifactor Productivity Growth and Levels for Canadian Provinces by Industry: 1997 to 2007", March, 2010.

# Innovation

## What it Means

Innovation is the catalyst behind productivity improvements. It allows organizations to turn knowledge and ideas into new goods and services and to employ resources more efficiently.

For this report, innovation broadly captures any new way of doing something better. Research and development (R&D) is one component to innovation, since it leads to new knowledge, products, processes and services. But organizations do not necessarily need to invest in R&D to be innovative. Investment in new machinery and equipment (M&E) and information and communications technology (ICT) is a common form of innovation since it allows organizations to adopt and diffuse the latest technology available. Improved organizational design and management is another key component of innovation, increasing the efficiency and effectiveness in which goods and services are produced.

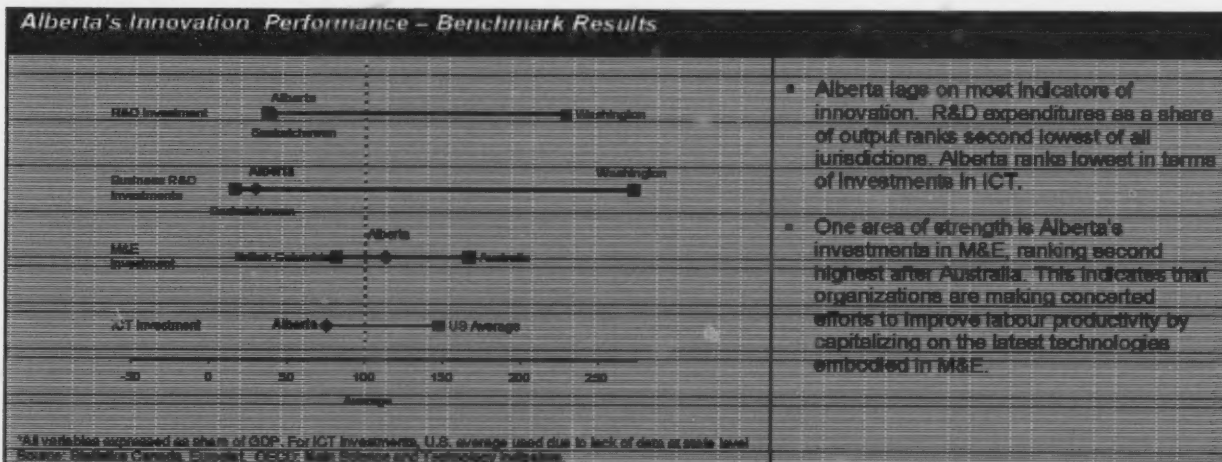
The degree to which organizations can be innovative rests on its human capital, or the skills and education of its workforce. As human capital reflects to a great extent investments in education and training, it is addressed in the Foundation section of this report.

## How it is Measured

Despite the importance of innovation to productivity and economic prosperity, it is a difficult concept to quantify. We rely on the few, internationally comparable indicators — investments in R&D and M&E expressed as a share of economic output (i.e., GDP). These are inputs to innovation, indicating the efforts taken to improve innovation performance. Unfortunately, measurable and comparable output indicators of innovation, such as the rate of technology adoption and commercialization, are currently unavailable.

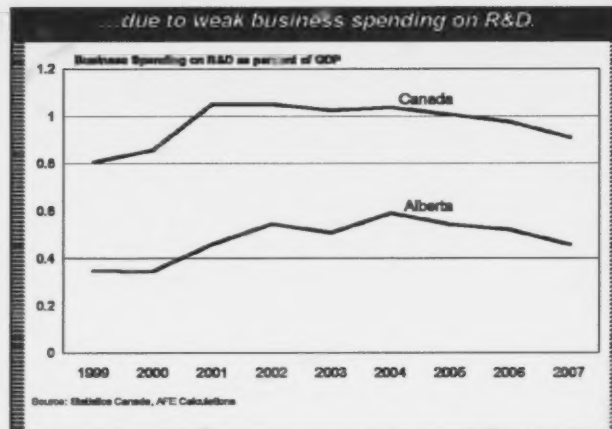
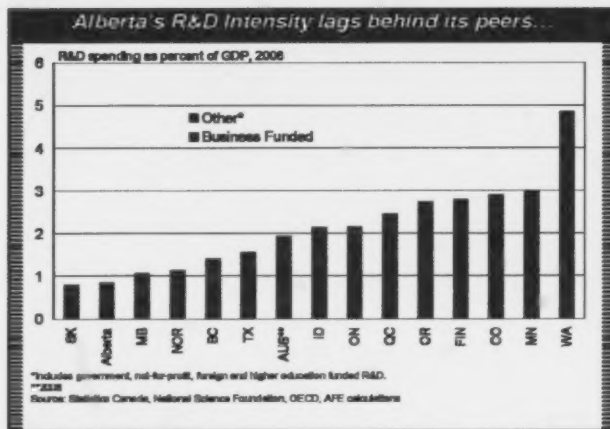
Recent studies have shown a particularly strong link between information and communications technology (ICT) investments (a component of M&E) and productivity — a finding that likely relates to the shorter life and rapid pace of technological change in ICT equipment. As such, both total M&E and ICT investments as a share of GDP are reported.

## How Alberta Performs



<sup>7</sup> For this report, we have grouped investments in ICT and M&E under innovation. Some studies treat these investments separately. However, in our view, innovation and investment are highly linked because new, innovative technologies are embodied in M&E and ICT.

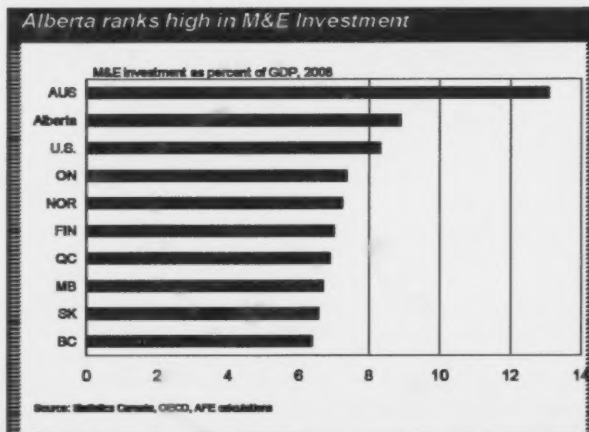
R&D is a key component to the innovation process, leading to the development of new products and services. On a global scale, Alberta's R&D investment intensity – R&D spending as a share of GDP – ranks well below its peers, ahead of only Saskatchewan. Indeed, R&D intensity in Alberta is 60% below the average of all jurisdictions and nearly 40% less than the average of the Canadian jurisdictions.



A closer look reveals that the business sector largely explains Alberta's weak R&D performance. Spending by Alberta businesses on R&D (as a share of GDP) ranks last among the four largest provinces, sits at about half the national average and has dipped in recent years. This finding is troublesome. Business R&D tends to be market-oriented and is associated with the commercialization of new technologies. Moving forward, ongoing weakness in business R&D may inhibit productivity gains and the ability of Alberta businesses to compete globally.

The good news is that Alberta businesses spend significantly more than their peers on M&E (as a share of economic output). These investments allow businesses to harness the latest in global technologies, yielding productivity gains. Part of Alberta's strength in M&E can be traced to the province's capital-intensive energy sector. Yet Alberta's M&E performance ranks well ahead of most jurisdictions even excluding the oil and gas industry.<sup>8</sup>

ICT investments also help enhance productivity, improving the efficiency in which goods and services are produced across all sectors. The level of ICT investment also varies across sectors of the economy. The Canadian Center for the Study of Living Standards (CSLS) reports that Canada continues to lag behind the U.S. in terms of ICT investment, coming in at about two-thirds the level of the U.S.<sup>9</sup> Alberta's ICT investments (as a share of GDP) rank last of all benchmarked jurisdictions, but fall only slightly behind the benchmarked Canadian provinces. Measuring the level of ICT capital per worker, Alberta fares much better, coming in above the national average as of 2007.<sup>10</sup>



<sup>8</sup> Energy sector investment is concentrated in structures, not M&E. In 2006, the latest year data are available at the industry level, the M&E to GDP ratio for all industries excluding oil and gas extraction was over 9.5% compared to 7.6% for Canada.

<sup>9</sup> As a share of GDP, ICT investments in Canada are 69% the level of the U.S. Source: CSLS (2009). "The Canada-U.S. ICT Investment Gap in 2008: Gains in Communications Equipment and Losses in Computers", December.

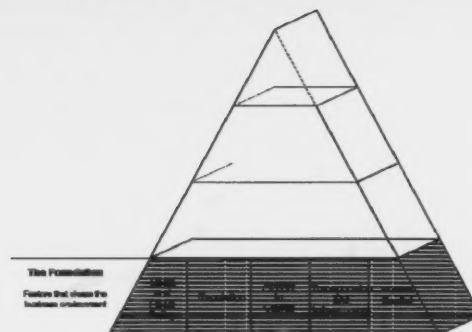
<sup>10</sup> Conference Board of Canada (2009) "Western Canada Productivity, Competitiveness and Potential", June.



# The Foundation

## What it Means

The Foundation of the competitiveness pyramid contains the future drivers of Alberta competitiveness. It comprises the factors and conditions necessary to enable industry to be innovative, and hence more productive. These factors and conditions include taxes and fiscal policy, regulation, transportation and infrastructure, human capital and access to capital.



The Foundation could also be thought of as the conditions that shape the Alberta business environment and determine the competitiveness potential of the province. While creating these enabling conditions is primarily the role of government, it is a process that requires close collaboration with industry. Developing a robust Foundation is not sufficient to secure sustained economic prosperity. Industry and Albertans, through innovation, must capitalize on the conditions laid out by the government, increasing productivity and ensuring sustained economic prosperity.

## How it is Measured

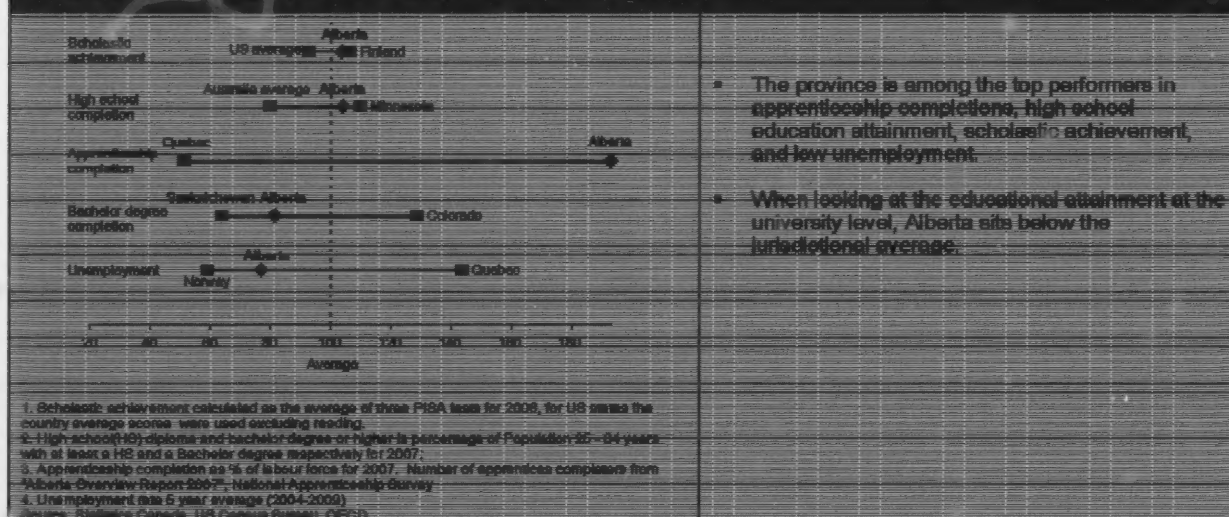
Achieving productivity gains requires the right mix of foundational factors. Yet measuring Alberta's performance on these factors is a difficult task, requiring careful weighing of the costs and benefits of different (and sometimes competing) public policy choices.

A robust Foundation could be characterized as one in which the tax system is highly attractive for business investment, fiscal policy is conducted prudently and responsibly, the regulatory process is streamlined and responsive, capital is available, transportation corridors are well-developed and infrastructure is of high-quality, and the labour force is skilled and educated.

For each Foundational factor, this report focuses on a number of measures that are shown to support productivity (e.g., educational attainment, expenditures on infrastructure, venture capital activity, and marginal effective tax rates, etc.), that together serve to assess the robustness of the Foundation as a whole.

## How Alberta Performs – Human Capital

### Alberta's Human Capital Performance – Benchmark Results



The province is among the top performers in apprenticeship completion, high school education attainment, scholarly achievement, and low unemployment.

When looking at the educational attainment at the university level, Alberta sits below the jurisdictional average.

### Educational Attainment

Educational attainment is widely used indicator of labour force skills and how successful a particular region has been in developing and attracting human capital. Within a competitiveness framework, educational attainment is key in measuring a jurisdiction's potential to innovate and be more productive.

Alberta's educational attainment is slightly above the jurisdictional average in terms of individuals aged 25 to 64 with at least a high school degree, ranking 7<sup>th</sup> among all jurisdictions and 2<sup>nd</sup> among its Canadian peers. However, in terms of the proportion of the adult population (25-64 years of age) with at least a bachelor's degree, Alberta placed well below the jurisdictional average, ahead of only Saskatchewan, Manitoba and Quebec according to the most recently available data.

Including all levels of post-secondary education, Alberta is virtually on par with the national average. In 2006, about 60% of Alberta's adult (25-64 years) population had some form of post-secondary certificate, diploma or degree compared to 61% at the national level.<sup>11</sup> Alberta is a leader in apprentice completions. As a share of the labour force, Alberta produced the most apprentices, ranking well ahead of all benchmarked Canadian Provinces.

In recent years, a robust economy has created abundant job opportunities for Alberta's youth. An ongoing challenge will be to encourage young people to remain in school and develop their skills and knowledge despite opportunities in the marketplace. In 2007, Alberta had the highest percentage of 15-24 year olds who were not enrolled in educational programs of all Canadian Provinces and nearly all OECD countries.<sup>12</sup>

### Scholastic Achievement

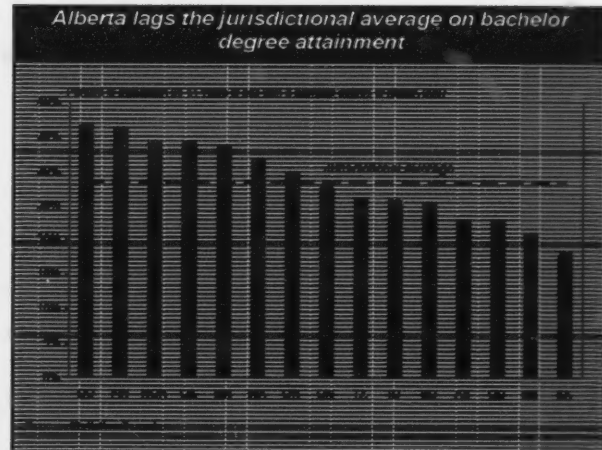
A measure of quality in a jurisdiction's education system is student achievement. Good scores in the Programme for International Student Assessment (PISA)<sup>13</sup> are widely recognized as an indicator of the quality of an education system. For this study, scholastic achievement has been measured as the average of PISA scores in math, science and reading for 2006.

Alberta students scored significantly well in the PISA tests, ranking second only after Finland. Moreover, Alberta was the only province to rank above the Canadian average for every subject tested. These results reflect the quality of Alberta's primary, middle, and secondary education systems, and the significant investments made by the province in recent years.

In an effort to modernize and continue to improve the quality of education, the Alberta Government continues to invest in the education system. In 2008, Statistics Canada reported that the Alberta Government spent over \$2,500 per capita on education, the highest among all provinces and well above the \$1,822 average of the Canadian provinces included in this study.

### Unemployment

A strong labour market engages people in the workforce and helps them develop their skills. The unemployment rate is one measure of workforce engagement, represented by the number of unemployed as a percentage of those able and willing to work. Low unemployment rates are a reflection of strong economic activity and flexible labour regulations. In this study, Alberta had the second lowest unemployment rate (after Norway) for the 2005-2009 period, an indication of strong economic conditions and a general lack of labour market rigidities. It is also noteworthy that Alberta has a



<sup>11</sup> In Alberta, 22% of adults (25-64) had a university degree or higher, 5% a university certificate or diploma, 22% a college diploma or certificate, and 2% a trades certificate. Source: Statistics Canada.

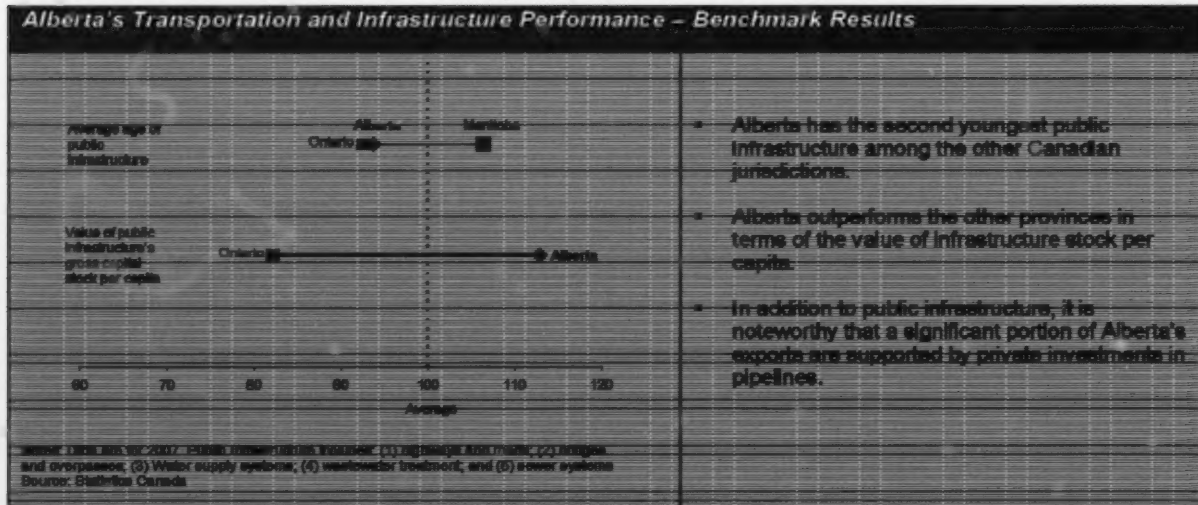
<sup>12</sup> Statistics Canada and the Council of Ministers of Education. "Education Indicators in Canada: An International Perspective" September 2009

<sup>13</sup> PISA is a triennial OECD internationally standardized assessment administered to 15-year-olds in schools.



relatively high share of adults participating in the labour force (i.e., those working or seeking work). In 2009, the percentage of the 16-64 year olds in the labour force was 74.3% compared 69.4% for the average of all jurisdictions.

## How Alberta Performs – *Transportation and Infrastructure*



A well-developed, high quality and modern public infrastructure plays a key role in improving Alberta's productivity and competitiveness. Consequently, industry and government should work together to ensure that Alberta's public infrastructure meets the challenges of ongoing economic and population growth.

Alberta's transportation network supports industrial activity by providing efficient ways to move goods and services to markets, reducing distance between markets, and encouraging trade. Similarly, access to other high-quality public assets, such as water supply and sewer systems, is paramount to attracting private investment, and supporting economic growth and quality of life.

Two indicators are used to measure performance in public infrastructure<sup>14</sup>:

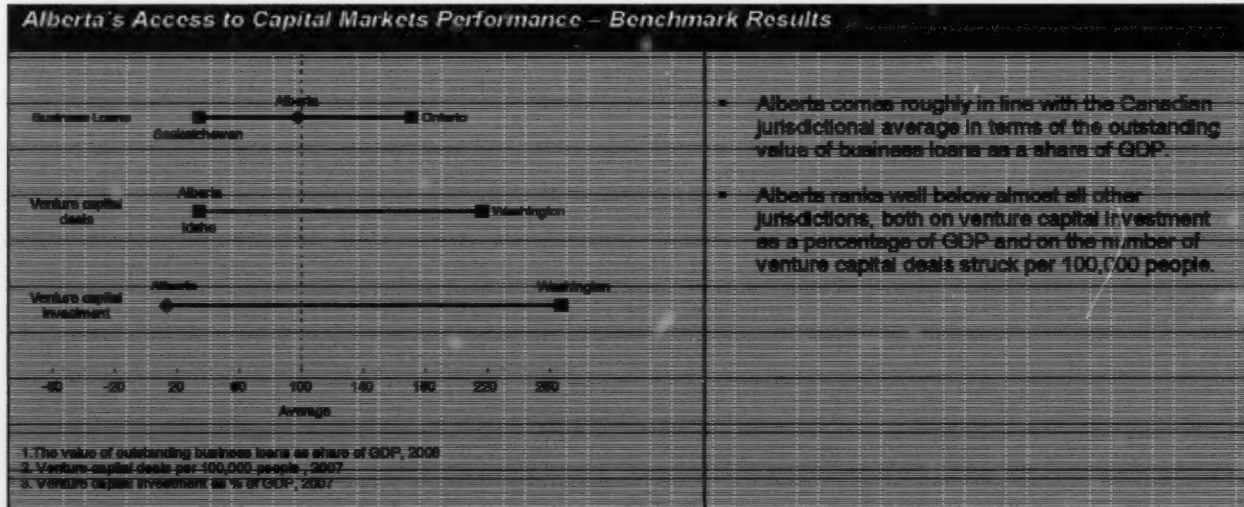
- Average age of infrastructure is a quality measure, with a low age signifying more recent investments in public infrastructure.
- The value of public infrastructure's gross capital stock indicator measures the cumulative investments made on public infrastructure on a per capita basis.

Alberta is a strong performer on both measures with the second youngest public infrastructure among the Canadian jurisdictions included in this study, and ranks highest on value of total public infrastructure's gross capital stock on a per capita basis.

In an effort to keep pace with robust economic and population growth, Alberta has made investments to expand and modernize the province infrastructure. According to Statistics Canada, the value of Alberta's total public infrastructure rose at a rate of 2.1% per year between 2001 and 2007, the largest increase among all provinces.

<sup>14</sup> For this study we have used the definition by Gagnon et al (2008), which defines public infrastructure as consisting of highways and roads, bridges and overpasses, water supply systems, wastewater treatment, and sewer systems. See Gagnon, Gaudreault and Overton (2008), "Age of Public Infrastructure: A Provincial Perspective", Statistics Canada Analytical Paper, Catalogue no. 11-621-MIE – No. 067.

## How Alberta Performs – Access to Capital Markets



The global financial crisis of 2008-2009 has highlighted the strengths of Canada's financial system. Unlike their international counterparts, Canadian banks remained profitable during the downturn and did not require massive bailouts handed out in other countries. This financial system resiliency has put Canada in the international spotlight. In 2009, the Global Economic Forum ranked Canada's banking system as the soundest in the world.<sup>15</sup> In terms of access to capital, the Milken Institute ranked Canada first among 112 countries for the second straight year in its 2009 Capital Access Index, which factors in a range of financial variables, such as bond financing, equity financing, alternative capital sources, financial institutions, international funding and macroeconomic environment.<sup>16</sup>

Alberta businesses benefit from Canada's well developed financial system. It is generally considered that Alberta business have strong and reliable access to conventional forms of debt and equity financing. In 2007, the value of outstanding business loans totalled 8% of GDP in Alberta in 2009, roughly in line with the average of Canadian jurisdictions in this report.

Venture capital is an important source of equity capital that helps finance innovation – turning ideas into new and improved products, services and process for the global marketplace. Venture capital fills the funding gap, providing financing to young, higher-risk and innovative ventures that is difficult to obtain through conventional sources.

The benchmarking results show that venture capital across all sectors continues to be much less common in Alberta relative to almost all other jurisdictions. In 2007<sup>17</sup>, Alberta had the second lowest number of venture capital deals per 100,000 people of all jurisdictions. Furthermore, Alberta registered the lowest dollar amount of venture capital investment as a percentage of GDP of all jurisdictions and accounted for less than 3% of Canada's total venture capital investment.

Recent actions taken by the Government of Alberta may improve the province's relative performance on venture capital moving forward. These actions include the creation of the \$100 million Alberta Enterprise Fund (AEF) to leverage venture capital investment in the province and the introduction of an innovation tax credit for business expenditures on R&D.

<sup>15</sup> World Economic Forum, "The Global Competitiveness Report 2008-2009,"

<sup>16</sup> The Milken Institute, "Capital Access Index 2009: Best Markets For Business Access to Capital", April 2010.

<sup>17</sup> While 2009 data available, we use 2007 as a benchmark to avoid the impact of the financial crisis.

## How Alberta Performs – Regulation

The regulatory system is a key component to a jurisdiction competitiveness framework. A sound regulatory system is critical to achieving sustained economic prosperity, by protecting the interests of Alberta without creating unnecessary compliance and administrative costs to industry.

According to *Doing Business*, an initiative by the World Bank to measure the cost of doing business in 183 economies, smart regulation is "about governments working better to serve the interests of people: better protection, lower costs, faster and more predictable regulatory processes, less overlap and duplication, more rapid alignment with global best practices and greater transparency and accountability". Therefore, to be competitive and efficient, the regulatory process should be streamlined and nimble.

We recognize the importance of measuring the performance of Alberta's regulatory system under the competitiveness framework developed in this study; however, at the time of this report, there were not enough regulation-specific data available on the benchmarked jurisdictions to draw meaningful comparisons.

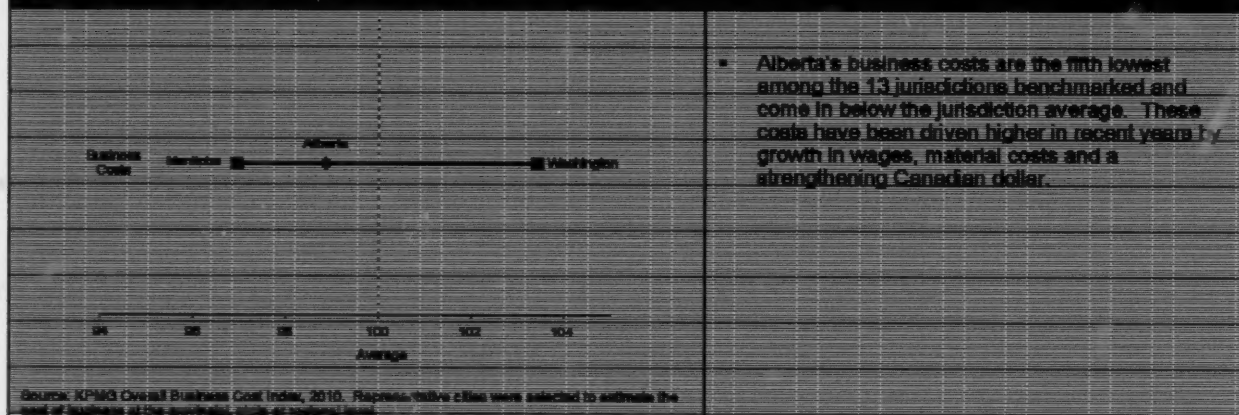
### Business Costs

Business costs are impacted by a jurisdiction's regulatory system. For example, electricity market regulation will have an impact on power usage costs, while labour market rules impact labour costs. Regulations also impose a cost on industry through compliance activities, including administration, inspections and mandatory equipment purchases, etc.

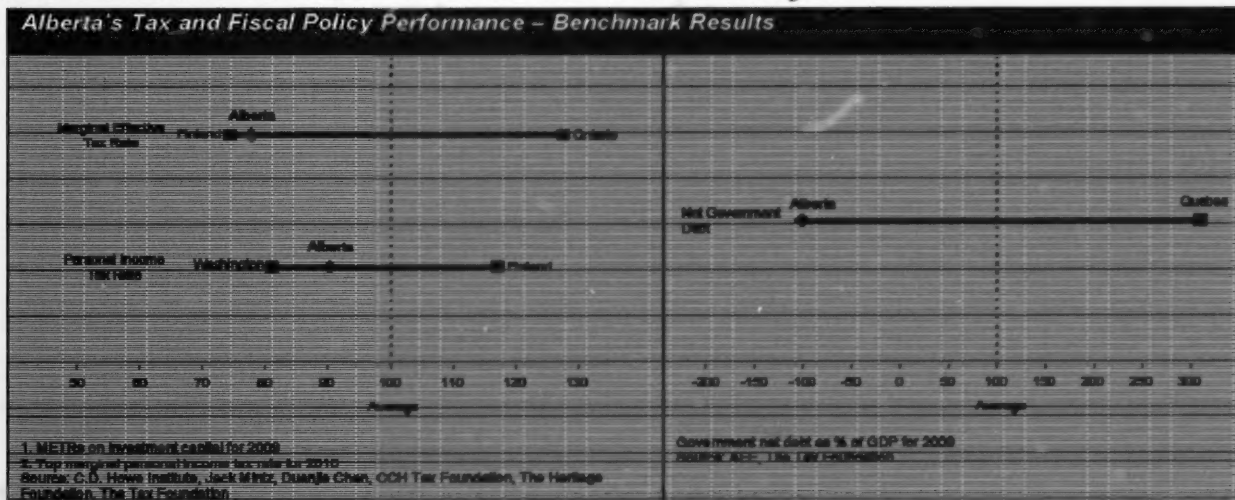
While business costs are to a large extent shaped by market forces, it is important that a jurisdiction monitor costs to ensure they are not being driven higher by excess or ineffective regulation. Businesses operating in a higher cost environment are forced to achieve stronger productivity gains in order to remain competitive.

According to the KPMG Overall Business Costs Index, Alberta ranks slightly below the jurisdictional average, and has the second highest costs among the Canadian jurisdictions included in this study.

### Alberta's Business Costs – Benchmark Results



## How Alberta Performs – Taxes and Fiscal Policy



### Taxes

With increasing degrees of capital mobility, the neutrality of a tax system plays a key role on investors' decisions on where to invest. The location decision will depend on the tax system of each jurisdiction considered, and is commonly evaluated by calculating the marginal effective tax rate (METR).

The METR is a summary measure of the total tax burden on new investment in a particular jurisdiction. The size of this tax burden will depend on a number of factors, including income tax rates, depreciation provisions, the tax treatment of the financing of the investment, indirect taxes, and tax allowances. All else equal, an informed investor facing different location options for his or her investment will choose the jurisdiction with the lowest METR.

The top marginal personal income tax rate is the combined federal and provincial tax rates levied on the highest personal income bracket. Similar to the METR, a high skilled individual is more likely to seek employment in jurisdictions with low top marginal personal income tax rates.

High taxes can stifle investments in productivity-enhancing equipment and human capital. To this end, Alberta is ahead of its competitors with a marginal effective tax rate on capital that is the second lowest of all benchmarked jurisdictions, after Finland, and a top marginal personal tax rate that ranks third lowest.

### Fiscal Policy

Fiscal prudence is a critical factor in laying the conditions for economic growth and prosperity. Excessive fiscal deficits, leading to future tax increases and higher borrowing costs, may destabilize the economic climate of a jurisdiction by discouraging both domestic and foreign investment. Defining what constitutes fiscal prudence is a complex task, and falls out of the scope of this study. Nevertheless, we attempt to illustrate the fiscal performance of the jurisdictions analyzed here by measuring the size of their debt as a percentage of GDP for 2009. Alberta, the only jurisdiction with a net financial asset position in 2009, is by far the top performer under this measure, reflecting the government share from energy developments through royalties and taxes<sup>18</sup>.

<sup>18</sup> Since a country fiscal policy differs significantly from that of a province or a state, Norway and Finland were not considered for this indicator.



## Sectors of Focus

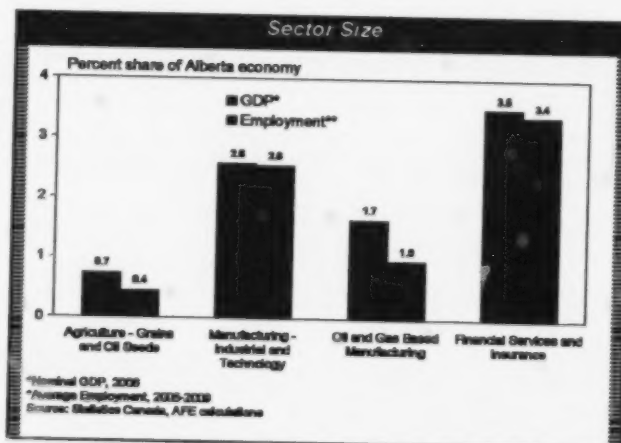
This report has presented an overall competitiveness framework for Alberta that is simple, yet broadly applicable to all sectors in the economy. Each sector of the economy faces a similar path to success, earned through concerted efforts to improve productivity through innovation.

At the same time, it is important to recognize that each sector faces unique issues and challenges in striving to become competitive. Moving forward, the Alberta Government in cooperation with Industry will be carrying out a targeted analysis of four key sectors over the next year (see Table below). These sectors have been selected because of their 1) importance to the Alberta economy and 2) opportunities for competitiveness improvement. In this section, we provide a brief introductory overview of the size and performance of each of these sectors.

Sector	Industries within Each Sector
Agriculture	-Grains and Oil Seeds Production -Support Activities for Agriculture
Financial Services	- Monetary Authorities and Depository Credit Intermediation -Non-Depository Credit Intermediation and Activities Insurance Carriers -Agencies, Brokerages and Other Insurance -Securities, Commodity Contracts, Funds, etc.
Manufacturing – Industrial and Technology	-Primary Metals -Fabricated Metals -Machinery -Transportation Equipment -Computers & Electronics -Electrical Equipment
Oil and Gas Based Manufacturing	-Chemicals -Refineries -Plastics & Rubber

### Sector Size

All four industries play an important role in the Alberta economy. The largest of the four is financial services, capturing about 3.5% of the province's economic output. These industries contributed over 8% to Alberta's economic output and about 7% of jobs.

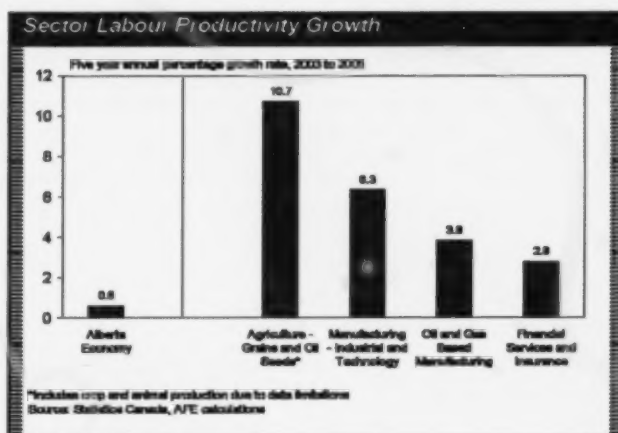
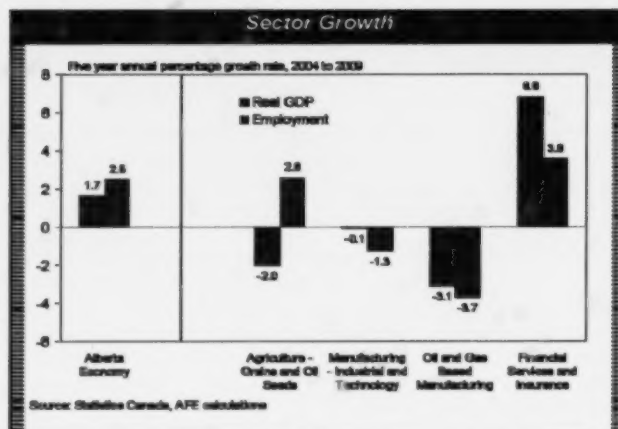


## Sector Performance

All sectors have been profoundly impacted by the global financial crisis and economic recession, particularly those with strong ties to the oil and gas industry.

- Oil and gas based manufacturers suffered the largest decline in GDP in 2009 of all four sectors. Over the last five years, the sector has witnessed the largest drop in employment.
- Reversing several years of solid performance, manufacturers of industrial equipment and technology have faced weak market conditions in the last two years, weighed down by the slowdown in oil and gas related capital spending. The sector has seen a drop in employment and GDP since 2004.
- Agriculture (grains and oilseeds) saw employment rise over the last five years, but recorded negative growth in GDP, brought down by drought conditions, rising input costs, a higher dollar and falling commodity prices.
- In stark contrast, the financial services sector continues to thrive. Despite turmoil in global financial markets, the sector faced only a mild downturn in 2009 and, over the last five years, has registered an impressive growth of 7% per year in GDP and 4% in employment.

In the face of challenging market conditions, all sectors have been remarkably resilient and focused on productivity improvements. The result has been a marked improvement in labour productivity performance – or GDP per hour worked – over 2003 to 2008.<sup>19</sup> All sectors have far outpaced the Alberta economy-wide average over the last five years, led by the Agriculture (grains and oil seeds) and the Industrial and Technology Manufacturing Sectors.



## Next Steps

This report has provided a framework for understanding the factors that impact Alberta's competitiveness. It also provides a snapshot, based on existing information sources, of Alberta's overall competitiveness relative to a number of comparative jurisdictions, identifying areas of strength and opportunities where improvements can be made. But it is only a starting point. Moving forward, the government is committed to clarifying Alberta's competitive position, both at an economy-wide and sector level. This preliminary analysis is a stepping stone to a more comprehensive analysis of Alberta's economic and sectoral competitiveness.

<sup>19</sup> Labour productivity data by sector is only available to 2008.